NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

FORAGE AND BIOMASS PLANTING

(Ac.)

CODE 512

DEFINITION

Establishing adapted and /or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production.

PURPOSE

- Improve or maintain livestock nutrition and/or health.
- Provide or increase forage supply during periods of low forage production.
- Reduce soil erosion
- Improve soil and water quality.
- Produce feedstock for biofuel or energy production.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands suitable to the establishment of annual, biennial or perennial species for forage or biomass production. This practice does not apply to the establishment of annually planted and harvested food, fiber, or oilseed crops.

CRITERIA

General Criteria Applicable to All Purposes

Select plant species and their cultivars based on:

- Climatic conditions, such as annual precipitation and its distribution, growing season length, temperature extremes and the USDA Plant Hardiness Zone.
- Soil condition and landscape position attributes such as pH, available water holding capacity, aspect, slope, drainage class, fertility level, salinity, depth, flooding and ponding, and levels of toxic elements that may be present
- Resistance to disease and insects common to the site or location.
- Compatibility with other species and selected cultivars as to rate of establishment and growth habit when seeded together as a mixture.
- Capability of the plant material(s) to achieve the desired purpose(s)

Follow recommendations for planting rates, methods, and dates obtained from the plant materials program, land grant and research institutions, extension agencies, or agency field trials. .

Apply all plant nutrients and/or soil amendments for establishment purposes according to a current soil test. Application rates, methods and dates are obtained from the plant material program land grant research institutions, extension agencies, or agency field trials.

Refer to **Plant Material Technical Note OK-21** for species selection, variety, planting dates, planting rates, soil amendments and all other considerations associated with this standard.

Planting dates shall be scheduled during periods when soil moisture is adequate for germination and establishment.

Seeding rates will be calculated on a pure live seed (PLS) basis

Plant at a depth appropriate for the seed size or plant material, while assuring uniform contact with the soil surface

Prepare the site to provide a medium that does not restrict the plant emergence.

Plant when soil moisture is adequate for germination and establishment.

All seed and planting material will meet state quality standards.

Do not plant federal, state or local noxious species. A list of these plants can be found in the state noxious weed law and rules located at the Oklahoma Department of Agriculture Food and Forestry website currently at:

http://www.oda.state.ok.us/forms/law/noxweedlaw.htm

When planting legumes, use pre-inoculated seed or inoculate with the proper viable strain of Rhizobia immediately before planting.

Exclude livestock until the plants are well established.

Select forage species based on the intended use, level or management, realistic yield estimates, maturity stage, and compatibility with other species. Verify plant adaptation to the area prior to planting.

Additional Criteria for Improving or Maintaining Livestock Nutrition and/or Health

Establish forage species that are most capable of meeting the desired level of nutrition (quantity and quality) for the kind and class of the livestock to be fed.

Forage species planted in mixes shall exhibit similar palatability to avoid selective grazing.

When the primary purpose of the planting is for livestock grazing, legumes shall not exceed 50% of the mixture due to potential bloating problems.

Additional Criteria for Balancing the Forage Supply and Demand during Low Forage Production Periods

Select plants meet livestock forage demand during times that normal farm/ranch forage production are not adequate.

Annual cool season or warm season plants can be used to supplement primary perennial forages as part of an ongoing forage program or in years when drought, pests, or other natural disaster reduces primary forage production.

When adding legumes or planting in mixtures for the primary purpose of harvesting hay, legumes shall not exceed 75% of the mixture.

Additional Criteria for Reducing Erosion and Improving Water Quality

Ground cover and root mass need to be sufficient to protect the soil from wind and water erosion.

The amount of cover needed to reduce erosion to the planned soil loss objective shall be determined using the current approved wind and/or water erosion prediction technology.

Additional Criteria for Producing Feedstock for Biofuel or Energy Production.

Select cultivars of plants that produce the plant material desired, along with adaptability to the site under consideration. Consider plantings on moderately fertile or better sites and using sound management techniques including proper soil fertility by species, harvest techniques and stand evaluation. Consider native tallgrass plants which produce significant amounts of above ground biomass that grow upright in stature.

Additional Criteria for Establishing Adapted and Compatible Species, Varieties or Cultivars for Forage Production

Select forage species based on the intended use, realistic expected yield, maturity stage, compatibility with other species and expected level of management. Plant adaptation to the proposed planting area shall be verified prior to planting.

Some species may not be compatible for reasons such as differences in grazing heights, site adaptability, and competition. Refer to **Plant Material Technical Note OK-21** for considerations on site adaptability and the Oklahoma NRCS Prescribed Grazing (528) standard for compatible grazing heights.

CONSIDERATIONS

In areas where animals congregate consider establishing persistent species that can tolerate close grazing and trampling.

Where wildlife and pollinator concerns exist consider plant selection by using an approved habitat evaluation procedure to aid in selecting plant species that provide the habitat

requirements needed. For pollinators refer to Oklahoma NRCS technical note BIOLOGY OK – 33 for additional information on beneficial plants for pollinators.

Where air quality concerns exist, site preparation techniques should be utilized that will minimize airborne particulate matter generation and transport.

Drilling into prepared seedbeds is the preferred method for planting and should be considered as the first option.

Consider beginning seedbed preparation well in advance to allow for reduction of weed potential by using deep tillage early as well as time for soil to settle and firm.

Seeding operations with drills or use of sprigging equipment should not be done on clay soils when wet. As the soil dries, cracks can develop along the rows allowing the plants root system to dry out.

When planting on terraced land, a technical determination should be made concerning terrace removal prior to seeding. Terraces should be removed if:

- low places are allowing water to concentrate, preventing plant establishment,
- it is anticipated that future livestock trails will cause concentrated flow and excessive erosion,
- leaving them in place will cause poor water distribution or erosion,
- litter dams can cause overtopping,
- water starvation will have a significant impact on the seeded species below the terraces, or
- livestock are anticipated to concentrate on terraces because of higher soil fertility causing damage from spot grazing.

Where carbon sequestration is a goal, select deep rooted perennial species that will increase underground carbon storage.

During and upon establishment planning and application of the following conservation practices should be considered ass applicable; Forage and Biomass Harvest (511), Herbaceous Weed Control (315), Nutrient Management (590), and Prescribed Grazing (528).

PLANS AND SPECIFICATIONS

Prepare plans and specifications for the establishment planting for each site or management unit according to the Criteria Considerations, and Operations and Maintenance described in the standard. Record them on a site specific job sheet or in the narrative of a conservation plan.

Specifications to be included in the conservation plan are species and variety, planting dates and rates of planting, planting method, required seedbed condition and preparation methods, cover crop requirements, management during establishment and other information essential to the planting. Job sheets can be used to transfer the technology. Vegetative Data Worksheet, OK-CPA-4 is available for planning and certification.

The following elements will be addressed in the plan to meet the intended purpose.

- Site Preparation
- Fertilizer Application (if applicable)
- Seedbed/Planting Bed Preparation
- Methods of Seeding/Planting
- Time of Seeding/Planting
- Selection of Species
- Type of legume inoculants used (if applicable)
- Seed/Plant Source
- Seed Analysis
- Rates of Seeding/Planting
- Supplemental Water for Plant Establishment (if applicable)
- Protection of Plantings (if applicable)

OPERATION AND MAINTENANCE

Inspect and calibrate equipment prior to use. Continually monitor during planting to insure proper rate, distribution and depth or planting material is maintained.

Monitor new planting for water stress. Depending on the severity of drought, water stress may require reducing weeds, early

harvest of any companion crops, irrigating when possible, or replanting failed stands.

REFERENCES AND OTHER READING MATERIAL

Oklahoma State University, CIRCULARS and Fact Sheets: E-949, PSS-2585, NREM-2581, F-2583

Ball, D. M., C. S. Hoveland, & G. D. Lacefield. 2007 Southern Forages, 4th Ed. International Plant Nutrition Institute, Norcross, GA

Barnes, R.F., D.A. Miller, and C.J. Nelson. 1995. Forage, The Science of Grassland Agriculture, 5th Ed. Iowa State University Press, Ames

United State Department of Agriculture, Natural Resources Conservation Service. 1997. National Range and Pasture Handbook. Washington, D.C.

USDA, NRCS. 2008. The PLANTS Datatbase (http://plants.usda.gov , 08October2008) National Plant Data Center, Baton Rouge, la 70874-4490 USA.

USDA , NRCS. Technical Note 3. Planting and Managing Switchgrass as a Biomass Energy Crop.

Performance of Forage Bermudagrass Varieties in Oklahoma Tests, 1998-2004

Legumes. The Samuel Roberts Noble Foundation Inc., Ardmore, Oklahoma

Archived NRCS State Pasture Planting Standards

REVIEWERS

Oklahoma State University, Department of Plant and Soils Sciences

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The Noble Foundation

NRCS, OK

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